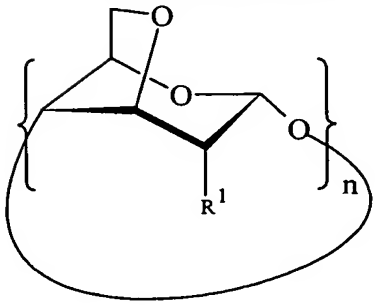
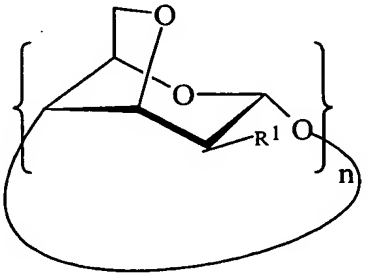
CLAIMS

1. Per(3,6-anhydro)cyclodextrin derivative corresponding to one of the following formulae:



(I)



(II)

in which:

- at least one of the groups R^1 represents a group $-OCONHR^2$ and the other groups R^1, which may be identical or different, represent a group corresponding to one of the formulae: $-OCONHR^2$, $-OH$, $-OR^3$, $-SH$, $-SR^3$, $-OCOR^3$, $-NH_2$, $-NHR^3$, $-NR^3R^4$, $-CONH_2$, $-CONHR^3$, $-CONR^3R^4$, $-CN$, $-COOR^3$, $-OCH_2CO_2H$, $-COOH$ and $-R^3$, in which the group(s) R^2, which are identical or different, represent a saturated or unsaturated aliphatic group, R^3 and R^4, which are identical or different, represent a saturated or unsaturated, aliphatic or aromatic hydrocarbon group optionally substituted with halogen atoms which may contain one or more heteroatoms chosen from O, S and N, and/or

- at least one of the groups R^1 represents a group $-OCONH(CR^5R^6)_mNHCOOR^7$, the other groups R^1 corresponding to the same definition as that given

above, R^5 and R^6, which are identical or different, represent H or a saturated or unsaturated aliphatic group, and R^7 represents a glucosidic or maltosidic unit of the peranhydrocyclodextrin and m is an integer ranging from 1 to 20;

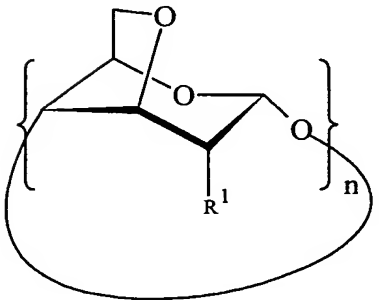
- n is equal to 6, 7 or 8.

2. Per(3,6-anhydro)cyclodextrin derivative according to Claim 1, in which all the groups R^1 represent the group $-OCONHR^2$ with R^2 having the same meaning as in Claim 1, and n is equal to 6.

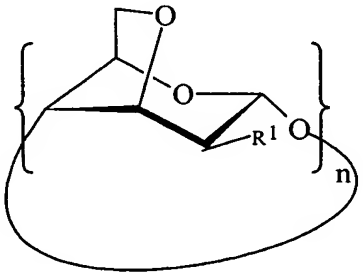
3. Per(3,6-anhydro)cyclodextrin derivative according to Claim 2, in which R^2 represents an ethyl radical.

4. Per(3,6-anhydro)cyclodextrin derivative according to Claim 2, in which R^2 represents a hexyl radical.

5. Method for preparing a per(3,6-anhydro)cyclodextrin derivative corresponding to one of the following formulae (I) and (II):



(I)



(II)

in which:

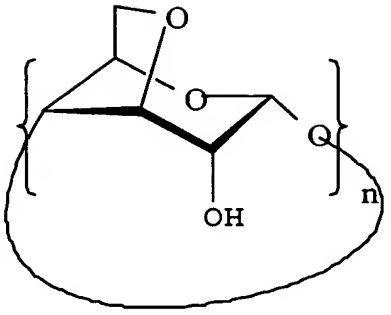
- at least one of the groups R^1 represents a group $-OCONHR^2$ and the other groups R^1, which may be identical or different, represent a group corresponding to one of the formulae: $-OCONHR^2$, $-OH$, $-OR^3$, $-SH$, $-SR^3$, $-OCOR^3$, $-NH_2$, $-NHR^3$, $-NR^3R^4$, $-CONH_2$, $-CONHR^3$, $-CONR^3R^4$, $-CN$, $-COOR^3$, $-OCH_2CO_2H$, $-COOH$ and $-R^3$, in which the R^2 group(s), which are identical or different, represent a saturated or unsaturated aliphatic group, R^3 and R^4, which are identical or different, represent a saturated or unsaturated, aliphatic or aromatic hydrocarbon group optionally substituted with halogen atoms which may contain one or more heteroatoms chosen from O, S and N, and/or

- at least one of the groups R^1 represents a group $-OCONH(CR^5R^6)_mNHCOOR^7$, the other groups R^1 corresponding to the same definition as that given above, R^5 and R^6, which are identical or different, represent H or a saturated or unsaturated aliphatic group, and R^7 represents a glucosidic or maltosidic unit of the peranhydrocyclodextrin and m is an integer ranging from 1 to 20;

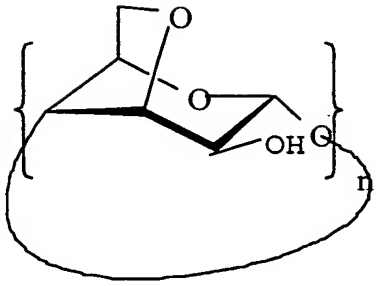
- n is equal to 6, 7 or 8,

said process comprising successively:

- a step consisting in reacting a per(3,6-anhydro)cyclodextrin corresponding to one of the following formulae (III) or (IV):



(III)

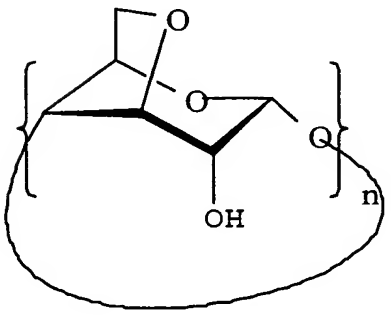


(IV)

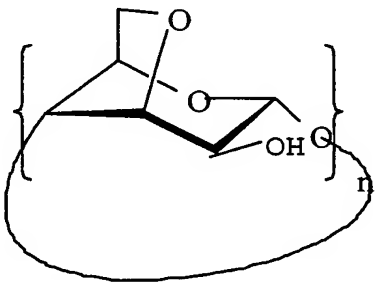
in which n is equal to 6, 7 or 8, with an isocyanate of formula OCN-R^2 and/or a diisocyanate OCN$(CR^5R^6)_mNCO$ in a quantity such that at least one of the OH groups is converted to a group -OCONHR^2 and/or to a group -OCONH$(CR^5R^6)_mNHCOOR^7$; and

- a step consisting, when not all the OH groups have been converted to a group -OCONHR^2 and/or -OCONH$(CR^5R^6)_mNHCOOR^7$, in optionally reacting the remaining OH groups with one or more reagents in order to convert them to the desired groups R^1 different from -OCONHR^2 and/or -OCONH$(CR^5R^6)_mNHCOOR^7$.

6. Polymer obtained by reacting at least two per(3,6-anhydro)cyclodextrins corresponding to one of the following formulae (III) or (IV):



(III)



(IV)

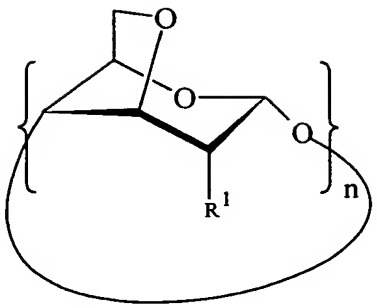
in which n is equal to 6, 7 or 8 and a diisocyanate of formula OCN- $(CR^5R^6)_m$-NCO, in which R^5 and R^6, which are identical or different, represent H or a saturated or unsaturated aliphatic group and m is an integer ranging from 1 to 20, the OH groups having not reacted during the reaction to be optionally converted into groups, which are identical or different, representing groups chosen from: $-OCONHR^2$, $-OR^3$, -SH, $-SR^3$, $-OCOR^3$, $-NH_2$, $-NHR^3$, $-NR^3R^4$, $-CONH_2$, $-CONHR^3$, $-CONR^3R^4$, -CN, $-COOR^3$, $-OCH_2COOH$, -COOH and $-R^3$, in which the group(s) R^2 represent a saturated or unsaturated aliphatic group, R^3 and R^4, which may be identical or different, represent a saturated or unsaturated, aliphatic or aromatic hydrocarbon group optionally substituted with halogen atoms which may contain one or more heteroatoms chosen from O, S and N.

7. Polymer according to Claim 6, for which n is equal to 6 and R^5 and R^6 both represent H and m is equal to 6.

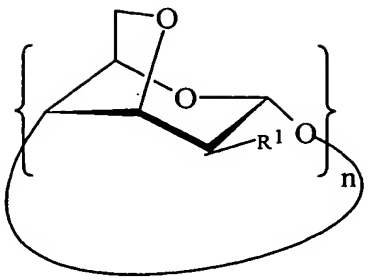
8. Method for binding and separating ions, comprising the steps consisting in:

- bringing a medium containing the said ions into contact with:

1) a per(3,6-anhydro)cyclodextrin derivative corresponding to one of the following formulae (I) or (II):



(I)



(II)

in which:

- at least one of the groups R^1 represents a group $-OCONHR^2$ and the other groups R^1, which may be identical or different, represent a group corresponding to one of the formulae: $-OCONHR^2$, $-OH$, $-OR^3$, $-SH$, $-SR^3$, $-OCOR^3$, $-NH_2$, $-NHR^3$, $-NR^3R^4$, $-CONH_2$, $-CONHR^3$, $-CONR^3R^4$, $-CN$, $-COOR^3$, $-OCH_2CO_2H$, $-COOH$ and $-R^3$, in which the group(s) R^2, which are identical or different, represent a saturated or unsaturated aliphatic group, R^3 and R^4, which are identical or different, represent a saturated or unsaturated, aliphatic or aromatic hydrocarbon group optionally substituted with halogen atoms which may contain one or more heteroatoms chosen from O, S and N, and/or

- at least one of the groups R^1 represents a group $-OCONH(CR^5R^6)_mNHCOOR^7$, the other groups R^1 corresponding to the same definition as that given above, R^5 and R^6, which are identical or different, represent H or a saturated or unsaturated aliphatic group, and R^7 represents a glucosidic or maltosidic

unit of the peranhydrocyclodextrin and m is an integer ranging from 1 to 20;

- n is equal to 6, 7 or 8,

and/or

2) a polymer obtained by reacting at least two per(3,6-anhydro)cyclodextrins of formula (III) or (IV), as defined in claim 6, and a diisocyanate of formula OCN- $(CR^5R^6)_m$-NCO, for which R^5 and R^6, which are identical or different, represent H or a saturated or unsaturated aliphatic group and m is an integer ranging from 1 to 20, the OH groups having not reacted during the reaction to be optionally converted into groups, which are identical or different, representing groups chosen from: -OCONHR^2, -OR^3, -SH, -SR^3, -OCOR^3, -NH$_2$, -NHR^3, -NR^{3}R^4, -CONH$_2$, -CONHR^3, -CONR^{3}R^4, -CN, -COOR^3, -OCH$_2$CO$_2$H, -COOH and -R^3, in which the group(s) R^2, which are identical or different, represent a saturated or unsaturated aliphatic group, R^3 and R^4, which may be identical or different, represent a saturated or unsaturated, aliphatic or aromatic hydrocarbon group which may contain one or more heteroatoms chosen from O, S and N, and n is equal to 6, 7 or 8, in order to bind the said ions in the form of a complex with the per(3,6-anhydro)cyclodextrin derivative or the polymer; and

- separating the said ions thus complexed from the said medium.

9. Method according to Claim 8, in which the said ions are anions based on chromium or manganese.

10. Method according to Claims 8 or 9, in which the per(3,6-anhydro)cyclodextrin derivative corresponds to formula (I) in which all the groups R^1 represent the group $-OCONHR^2$ with R^2 having the same meaning as in Claim 1, and n is equal to 6.

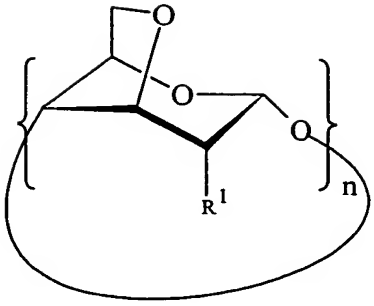
11. Method according to Claim 10, in which R^2 represents an ethyl or hexyl radical.

12. Method according to Claim 8 or 9, in which the polymer is as defined in Claim 7.

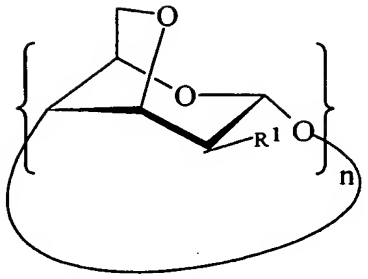
13. Method according to any one of Claims 8 to 12, in which, since the said medium is an aqueous solution, the per(3,6-anhydro)cyclodextrin derivative or the polymer is dissolved in an organic solvent which is immiscible with the said aqueous solution.

14. Pharmaceutical composition for the decontamination, in relation to ions based on chromium or manganese, of a human being, comprising:

(1) a per(3,6-anhydro)cyclodextrin derivative corresponding to one of the following formulae (I) or (II):



(I)



(II)

in which:

- at least one of the groups R^1 represents a group $-OCONHR^2$ and the other groups R^1, which may be identical or different, represent a group corresponding to one of the formulae: $-OCONHR^2$, $-OH$, $-OR^3$, $-SH$, $-SR^3$, $-OCOR^3$, $-NH_2$, $-NHR^3$, $-NR^3R^4$, $-CONH_2$, $-CONHR^3$, $-CONR^3R^4$, $-CN$, $-COOR^3$, $-OCH_2CO_2H$, $-COOH$ and $-R^3$, in which the group(s) R^2, which are identical or different, represent a saturated or unsaturated aliphatic group, R^3 and R^4, which are identical or different, represent a saturated or unsaturated, aliphatic or aromatic hydrocarbon group optionally substituted with halogen atoms which may contain one or more heteroatoms chosen from O, S and N, and/or

- at least one of the groups R^1 represents a group $-OCONH(CR^5R^6)_mNHCOOR^7$, the other groups R^1 corresponding to the same definition as that given above, R^5 and R^6, which are identical or different, represent H or a saturated or unsaturated aliphatic group, and R^7 represents a glucosidic or maltosidic

unit of the peranhydrocyclodextrin and m is an integer ranging from 1 to 20;

- n is equal to 6, 7 or 8,

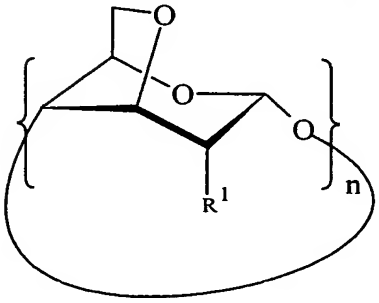
and/or

(2) a polymer as defined in Claims 6 and 7.

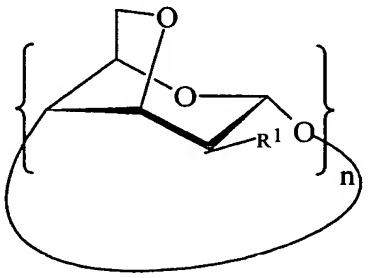
15. Pharmaceutical composition according to Claim 14, in which all the groups R^1 represent the group $-O-CO-NHR^2$ and n is equal to 6, R^2 having the same meaning as in Claim 1.

16. Complex of an ion chosen from CrO_4^{2-}, $Cr_2O_7^{2-}$ and MnO_4^{2-} with:

(1) a per(3,6-anhydro)cyclodextrin derivative corresponding to one of the following formulae:



(I)



(II)

in which:

- at least one of the groups R^1 represents a group $-OCONHR^2$ and the other groups R^1, which may be identical or different, represent a group corresponding to one of the formulae: $-OCONHR^2$, $-OH$, $-OR^3$, $-SH$, $-SR^3$, $-OCOR^3$, $-NH_2$, $-NHR^3$, $-NR^3R^4$, $-CONH_2$, $-CONHR^3$, $-CONR^3R^4$, $-CN$, $-COOR^3$, $-OCH_2CO_2H$,

-COOH and $-R^3$, in which the group(s) R^2, which are identical or different, represent a saturated or unsaturated aliphatic group, R^3 and R^4, which are identical or different, represent a saturated or unsaturated, aliphatic or aromatic hydrocarbon group optionally substituted with halogen atoms which may contain one or more heteroatoms chosen from O, S and N, and/or

- at least one of the groups R^1 represents a group $-OCONH(CR^5R^6)_mNHCOOR^7$, the other groups R^1 corresponding to the same definition as that given above, R^5 and R^6, which are identical or different, represent H or a saturated or unsaturated aliphatic group, and R^7 represents a glucosidic or maltosidic unit of peranhydrocyclodextrin and m is an integer ranging from 1 to 20;

- n is equal to 6, 7 or 8,

and/or

(2) a polymer as defined in Claims 6 and 7.

17. Complex according to Claim 16, in which the per(3,6-anhydro)cyclodextrin derivative corresponds to formula (I) in which all the groups R^1 represent the group $-O-CO-NHR^2$ and n is equal to 6, R^2 having the same meaning as in Claim 1.